Technologies for linking LANs to T1 networks emerge in products

BY CARL MALAMUD
SPECIAL TO CW

Fast packet, frame relay and cell relay: You've heard of them in relation to linking local-area networks across a T1 circuit (see story page 77). Now that the technologies are starting to show up in the form of real and announced products, you may be wondering which capabilities to choose for your LAN interconnection scheme.

The decision depends on the amount, type and speed of traffic crossing the T1 channel, as well as the distance being covered. In some cases, you won't need any of these new options.

Such would be the case when a network manager wants to integrate several different work groups into a single, logical network. Most bridges and routers now support 1.5M bit/sec. T1 links, which should provide sufficient bandwidth for two 10M bit/sec. LANs regularly exchanging data within a metropolitan area. Some LAN interconnectivity devices even support multiple T1 links for those users who want to interconnect multiple LANs or LANs with particularly high-volume traffic. The routing function inside of the device decides which line to use for any given packet.

Cisco Systems, Inc.'s AGS+ router supports more than 20 T1 lines. The lines can go to 20 different locations, or multiple lines can go to one location, providing increased bandwidth and some protection against line failures.

Dedicated T1 lines are not always economically feasible, however, and traffic does not always travel in a steady stream, especially between LANs. With T1 lines costing several dollars per mile per month in a national network, it makes economic sense to allocate the T1 bandwidth among several different applications, including LAN interconnection, voice and video.

One way to do this is through a T1 multiplexer, which serves as an entry point to the T1 network for both LAN interconnectivity devices and other customer premises equipment such as private branch exchanges. The multiplexer allocates subchannels within the T1 link to LANs, voice, video and other applications through circuit-switching technology.

While circuit switching is an inexpensive technique, it also requires dedicated bandwidth allocation, which can be inefficient if the traffic on each circuit is not continuous. The technologies that are starting to address more flexible bandwidth allocation are frame relay and its counterpart, cell relay. The CCITT standard-based version of cell-relay technology is called Asynchronous Transfer Mode. Frame relay and cell relay are both fast-packet technologies.

Frame relay is both an interface and a transport service that handles packets of variable length. By contrast, cell relay interfaces and transports packets of fixed length. Frame- and cell-relay interfaces and transport services can be mixed and matched. For example, Stratacom's $12,500 packet assembler/disassembler (PAD) for its IPX T1 multiplexer uses frame relay on the application side of its interface and a proprietary cell-relay technique on the wide-area network side.

When both nodal processors — on the sending and receiving end — support packet-switching technologies, such as frame and cell relay, they can dynamically allocate bandwidth for applications as needed instead of fixing a maximum for each one. For instance, if data and voice share a T1 pipe, the nodal processor can squeeze a little more data into the gaps between words, giving more rapid throughput for the data application.

Rush-hour traffic

Frame relay parallels X.25 packet switching in that it allows a LAN interconnection device to tell a nodal processor it wishes to set up a virtual circuit in the private network. It is also specifically designed to handle traffic sent in bursts. It is faster than traditional packet-switching in that it eliminates error-detection and correction on each network link, as does cell relay. Error-checking at only the origin and destination nodes is made possible by today's highly reliable communications media, such as fiber-optic cabling.

Frame-relay products are just starting to hit the market. Cisco and Stratacom are shipping products, and Codex Corp., which has a 20% investment in Stratacom and resells the IPX as its 6290 T1 multiplexer, said it will also support frame relay on its 6525 X.25 packet switch and 6507 PAD in first-quarter 1991.

While frame relay has shown up only in equipment for private networks, it can be used as an interconnection to a public data network. In this case, the user needs to purchase only the bridge, router or gateway that supports frame relay and let the carrier provide the nodal processors and transport service. U.S. Sprint Communications Co. has announced frame-relay service for late 1991, and Northern Telecom, Inc. has announced equipment that will allow other carriers to offer public frame-relay-based services in the future.

Senior writer Joanie M. Wexler contributed to this report.

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